

### **AMENDMENTS TO THE DRAWINGS**

The drawings filed on April 8, 2004 are objected to by the Examiner. Please substitute the attached Replacement Sheets for Sheets 1-5 of the drawings submitted on April 8, 2004. It is noted that in the interest of efficiency Applicants' draftsperson has reduced the number of sheets of drawings by including more drawings on a sheet than were submitted on a sheet in the original filing of the informal drawings.

## **REMARKS**

Claims 1-15, of which claim 1 is independent, are examined in the outstanding Office Action.

### **Claim Rejections Under 35 USC §112**

#### **Written Description Requirement**

Claims 1-15 are rejected under 35 USC § 112, paragraph 1, as failing to satisfy the written description requirement. Applicants respectfully submit that the rejection is improper and that claims 1-15 comport with the written description requirement.

To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. MPEP § 2163 I. The function of the written description requirement is to ensure that the inventor had possession of, as of the filing date of the application relied on, the specific subject matter claimed; how the specification meets this requirement is not material. MPEP § 2161.01 I. There is no *in haec verba* requirement, and claims may be supported by the specification through express, implicit, or inherent disclosure. MPEP § 2163 I B.

Further, it is noted that inventors are entitled to a presumption that the written description requirement is met. A description as filed is presumed adequate unless or until sufficient reasoning to the contrary has been presented by the Examiner to rebut the presumption. See MPEP § 2163 III A. The Examiner has the burden of presenting initial evidence by a preponderance of evidence why a person skilled in the art would not recognize in an applicant's disclosure a description of the invention defined by the claims. *Id.* Express findings by the Examiner are required that: (A) identify the claim limitation at issue; and (B) establish a *prima facie* case by providing reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed. *Id.*

No such *prima facie* case is made in the outstanding Office Action. No specific claim limitation is identified in the rejection of claims 1-15 under the written description requirement. The outstanding Office Action, at page 3, does state that "[t]he specification does not appear to disclose values or ranges for the concentrations of rare earth within the inner and outer core

regions.” Assuming that the Office Action may be making reference to a “claim limitation at issue” with the statement regarding the lack of “values or ranges for the concentrations of rare earth”, it is respectfully pointed out that the claims do not as currently written recite any specific value for a concentration of rare earth (e.g., 5 mole %) or any range of such values.

Accordingly, there can be no requirement that the specification must explicitly disclose a specific value or ranges to provide written description support for the claims. Therefore it is respectfully submitted that the Office Action neither makes express finding (A) - identification of a claim limitation at issue - and accordingly cannot make an express finding (B) - establishing a *prima facie* case, including providing the requisite reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed. The presumption in favor of Applicants has not been rebutted and a proper *prima facie* case of lack of written description support for claims 1-15 has not been established.

Even though a *prima facie* case is not made out and the rejection should be withdrawn on that basis alone, it is further noted that in fact the language of claims 1-15 do find *in haec verba* support in specification of Applicants' Application. See, as one example, paragraphs 6-8 of the application as filed. Thus, it is respectfully submitted, the specification clearly demonstrates to one skilled in the art that the inventors had possession of the claimed invention at the time of the filing date of the Application and that claims 1-15 meet the written description requirement of 35 USC §112, paragraph 1.

Finally, it is noted that claims 1-15 were present in the above-identified application when filed, and hence are *original* claims. Such claims constitute their own written description, such that even if the above noted paragraphs 6-8 were not present in the application as filed, Applicants would be entitled to amend the specification to add the recitations of the claims to the body of the application. See MPEP § 2163 I B, citing *In re Benno*, 768 F.2d 1340, 226 USPQ 683 (Fed. Cir. 1985). Furthermore, rejection of such *original* claims for failing to meet the written description requirement is highly unusual and not encouraged by USPTO practice. The presumption of adequate written description is particularly strong for such *original* claims. See for example MPEP § 2163.03:

... [T]here is a *strong* presumption that an adequate written description of the claimed invention is present in the specification as filed. *In Re Wertheim*, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976). Consequently, rejection of an *original* claim for lack of written description *should be rare*. (emphasis added)

The admonition regarding the strong presumption that the written description is met by a specification as filed and/or the admonition that rejection of original claims should be rare is repeated throughout MPEP § 2163. See, for example, MPEP § 2163 I A; MPEP § 2163 II A; and MPEP § 2163 III A.

Accordingly, at least for the reasons noted above, it is respectfully submitted that claims 1-15 of the above-identified application conform to the written description requirement of 35 USC § 112, paragraph 1. Reconsideration and withdrawal of the rejection of claims 1-15 as failing to meet the written description requirement of 35 USC § 112, paragraph 1 is respectfully requested.

#### Enablement

Claims 1-15 are rejected under 35 USC §112, paragraph 1, as failing to comply with the enablement requirement. The Office Action contends that the claim(s) contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or is most nearly connected, to make and/or use the invention.

Applicants respectfully submit that the Office Action fails to establish a *prima facie* case of lack of enablement. The test of enablement is whether one reasonably skilled in the art could make and use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. MPEP § 2164.01. The burden is on the Examiner under the enablement requirement to establish a reasonable basis that that undue experimentation is required to practice the claimed invention. MPEP § 2164.04. The rejection must consider the *Wands* factors. MPEP § 2164.04.<sup>1</sup> The language of the rejection should focus on those factors, reasons, and evidence that lead the Examiner to conclude that the specification fails to teach how to make and use the claimed invention without undue experimentation, or that the scope of any enablement provided to one of ordinary skill in the art not commensurate with the scope of

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<sup>1</sup> The “Wands” factors are recited at MPEP § 2164.01(a) as follows: “(A) The breadth of the claims; (B) The nature of the invention; (C) The state of the prior art; (D) The level of one of ordinary skill; (E) The level of predictability in the art; (F) The amount of direction provided by the inventor; (G) The existence of working examples; and (H) the quantity of experimentation needed to make or use the invention based on the content of the disclosure.

protection sought by the claims. MPEP § 2164.04 (emphasis in original). References should be supplied if possible. Id. Specific technical reasons are required. Id.

Although all questions of enablement are evaluated against the claimed subject matter (MPEP § 2164.08), the present rejection does not identify specific claim language at issue (referring only to “claimed performance”). The entire rationale relied in the Office Action is presented in the assertion that “[t]he only description of the rare earth concentrations are directed to the amount of rare earth in one region compared to another region. There has been no disclosure of actual concentration values or ranges that are workable to achieve the “claimed performance.” The Office Action fails to consider any of the *Wands* factors. No specific technical reasons are provided as to why one of ordinary skill in the art would not be able make and use the claimed invention having the “claimed performance” without undue experimentation. More specifically, the burden is clearly on the Office to establish that undue experimentation is required by one of ordinary skill in the art to select appropriate concentrations of rare earth to achieve the claimed performance. No reasons provided why one of ordinary skill could not determine such concentrations without undue experimentation. Accordingly, on these grounds alone, the Office Action fails to establish a *prima facie* case of lack of enablement.

Furthermore, the Office Action does not consider what the Applicants’ specification *does* teach and how and why this teaching falls short of enabling the invention as claimed. “A specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as in compliance with the enablement requirement of 35 USC 112, first paragraph, unless there is a reason to doubt the objective truth of the statements therein which must be relied upon for enabling support.” MPEP § 2164.04. “It is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain *why* it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement.” Id. (emphasis in original). By contrast, the Office Action provides no reasoning or analysis as to why what Applicants do teach in their disclosure would not enable one of ordinary skill in the art to make and use the claimed invention without undue experimentation, or to why the guidance provided by the Applicants is to be doubted as insufficient.

For purposes of further responding, it is assumed that the “claimed performance” refers to the limitation in claim 1 that recites “the fiber further comprising a fundamental mode having an intensity profile at a first wavelength wherein the highest intensity of the intensity profile is no greater than 75% of the highest intensity of a Gaussian intensity profile normalized so as to have the same power as the intensity profile.” FIGURES 2 and 3 of Applicants’ specification and the accompanying description thereof at paragraphs 33 - 40 clearly describe the intensity profile of a fundamental mode, the relationship thereof to a Gaussian, and teach that a refractive index profile 58 having sections 66 that each comprise an index of refraction 68 that is higher than the index of refraction of section 62 by a selected “delta” 75 can provide an intensity profile having the claimed relationship to a Gaussian intensity profile. One of ordinary skill is directed to “the models noted in the Ghatak reference” (by paragraph 40 of Applicants’ specification) if further refinement of a refractive index profile is required. Furthermore, also available for further refinement, if necessary, are commercially available software packages, known for at least a decade, which can calculate an intensity profile from a refractive index profile (e.g., OptiBPM from Optiwave Systems Inc., available since 1993 according to the product description on the Optiwave website).

Further, one of ordinary skill in the art would have been aware as of the filing date of Applicants’ Application which dopants to select to achieve a particular index of refraction and how to incorporate those dopants into a fiber to provide a desired refractive index profile. For example, the properties of germanium, aluminum and phosphorus as index-increasing dopants and boron and fluorine as index-decreasing dopants are well known. Processes for fabricating optical fibers having such selected dopants have been invented and taught by many parties over the past three decades, starting in the 1970’s with the work of Maurer, Schulz and Keck at Corning and MacChesney and others at AT&T Bell Labs. The use of rare earth dopants in fibers to make lasers and amplifiers has been known for decades as well from the work of, for example, Snitzer at Polaroid in the 1980’s and MacChesney at AT&T Bell Labs. Entire books have been published regarding the use of rare earths in optical fiber lasers and amplifiers. See, for example, Rare-Earth-Doped Fiber Lasers and Amplifiers, Second Edition, edited by Michel J.F. Digonnet, published in 2001 by Marcel Dekker, Inc. of New York, 2001 (ISBN: 0-8247-0458-4). The first edition of the forgoing book was published in 1993. It is also noted that in many practices of Applicants’ invention following the guidance given in Applicants’ specification, one of ordinary

skill in the art would select a rare earth concentration, according to the techniques known in the art, to provide an “active” fiber device, such as a laser or amplifier, that has a desired performance as such, as noted at paragraphs 43 and 47 of Applicants’ specification. One of ordinary skill in the art would then use other known dopants, in accordance with teachings of Applicants’ disclosure, to adjust the refractive index of the regions of the fiber to provide a desired refractive index profile, taking into account the rare earth concentrations already selected according to other considerations. The MPEP repeatedly emphasizes that the specification need not disclose what is well known to those skilled in the art and preferably omits that which is well-known to those skilled and already available to the public. MPEP §§ 2164.01, 2165.05(a), 2164.08. All that is necessary is that one skilled in the art be able to practice the claimed invention, given the level of knowledge and skill in the art. MPEP § 2164.08. The specification provides significant guidance regarding achieving what it is presumed the Office Action means by “claimed performance.” Some of what was known as of Applicants’ filing date regarding dopants and incorporating them into a fiber is not repeated in the specification, and need not be.

The Office Action does not distinguish any of the dependent claims from independent claim 1 in the rejection of claims 1-15 for lack of enablement. Accordingly, it is considered that addressing the “claimed performance” limitation of claim 1 also addresses the Examiner’s concerns regarding the dependent claims.

Accordingly, for one or more of the forgoing reasons, it is respectfully submitted that Claims 1-15 meet the enablement requirement of 35 USC Section 112, paragraph 1. Reconsideration and withdrawal of the rejection is respectfully requested.

### **Rejection of Claims under §§ 35 USC 102, 103**

Claims 1-4 and 6-11 are rejected under 35 USC §102(b) as anticipated by US Patent No. 5,778,129 to Shukunami et al. (“Shukunami”). Claim 1 is independent.

Claim 1, in addition to other limitations, recites that “the fiber further comprises a fundamental mode having an intensity profile at a first wavelength wherein the highest intensity of the intensity profile is no greater than 75% of the highest intensity of a Gaussian intensity profile normalized so as to have the same power as the intensity profile.” The foregoing limitation recites a *comparison* between a fundamental mode having an intensity profile and a hypothetical (and typical, for most fibers) Gaussian intensity profile. To make the comparison,

the hypothetical Gaussian intensity profile is “normalized to have the same power as the intensity profile.” Clearly, the “intensity profile” recited in claim 1 is not itself a Gaussian intensity profile. If in fact the intensity profile were itself Gaussian, the “normalization” to arrive at the hypothetical “Gaussian profile normalized to have the same power as the intensity profile” would simply result in a hypothetical profile that was the same or substantially the same as the intensity profile, and the recitation of claim 1 that “the highest intensity of the intensity is no greater than 75% of the highest intensity of a Gaussian profile normalized so as to have the same power” would not be met.

The outstanding Office Action at pages 5-6 argues that foregoing limitation “the fiber further comprises a fundamental mode having an intensity profile at a first wavelength wherein the highest intensity of the intensity profile is no greater than 75% of the highest intensity of a Gaussian intensity profile normalized so as to have the same power as the intensity profile” is *inherently* met by the fiber shown at Figures 11A and 11B of Shukunami.

To meet the burden of showing inherency, the Office Action must provide a rationale or evidence tending to show inherency. The fact that a certain characteristic may be present in the prior art is not sufficient to establish the inherency of that result or characteristic. See MPEP § 2112. The limitation must necessarily be present in the teachings of the reference, such that it would be recognized as such by persons of ordinary skill in the art. MPEP §§ 2112, 2131.01. Inherency may not be established by mere probabilities or possibilities. MPEP § 2112. “In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.” MPEP § 2112 IV, quoting *Ex parte Levy*, 17 USPQ2d 1461, 1464 (*Bd. Pat. App. & Int.* 1990) (emphasis in original quotation)).

In the rejection of claim 1, the Office Action alleges that the fiber shown at Figures 11A and 11B of Shukunami has substantially same structure as the fiber of Applicants’ claim 1, and that therefore there is a presumption that the fiber has the same properties or function as well, citing MPEP § 2112.01. Therefore, according to the Office Action, the limitation “the fiber further comprises a fundamental mode having an intensity profile at a first wavelength wherein the highest intensity of the intensity profile is no greater than 75% of the highest intensity of a Gaussian intensity profile normalized so as to have the same power as the intensity profile” is



met by the fiber of Figures 11A and 11B of Shukunami. Applicants need not address herein their disagreement with contention of the Office Action that the fiber of Figures 11A and 11B of Shukunami is substantially identical to the fiber of claim 1, as the disclosure of Shukunami indicates clearly indicates that the foregoing limitation is not inherently met.

In describing the fiber of Figures 11A and 11B thereof, Shukunami teaches that the electric field (and hence the intensity profile) of the fiber is *Gaussian*, which, as noted above, does not meet the aforementioned limitation of claim 1. See, for example, Shukunami at column 9, lines 52-65:

Where a doped fiber is of the single mode type, the electric field amplitude of light guided by the fiber generally exhibits a maximum value at the center of the core and gradually decreases away from the center. *The electric field amplitude exhibits a Gaussian distribution* and the periphery thereof overlaps with a portion of the clad in the proximity of the core. In the embodiment of the present invention illustrated in FIG. 11A, since  $E_r$  and  $A_1$  can be distributed over a wide range in the *Gaussian distribution*, an amplification action can be achieved without greatly increasing the concentrations of doped  $E_r$  and  $A_1$ . As a result, the loss of the doped fiber is reduced, pumping of a longer doped fiber can be achieved by pump light of a specific power and effective optical amplification can be achieved. (emphasis added)

It follows from Shukunami's statement that the "electric field amplitude exhibits a Gaussian distribution", that the intensity profile is therefore also Gaussian, as is explained in paragraph 53 of Applicants' application as filed.<sup>2</sup>

"Mere probabilities" are not sufficient to show inherency. In the present case the disclosure of Shukunami does not even rise to a mere probability, and accordingly it certainly cannot be said that the above-discussed limitation of claim 1 regarding the intensity profile *necessarily* must be present in the disclosure of Shukunami. Even if a presumption based on substantially identical structure were to be warranted (Applicants do not agree that it is), the presumption is rebutted based on the Shukunami disclosure that the fiber of Figures 11A and 11B does not meet the claim limitation of claim 1. Reconsideration and withdrawal of the rejection of claim 1 as anticipated by Shukunami is respectfully requested.

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<sup>2</sup> Paragraph 53 of Applicants' application as filed reads in part as follows: "[a] Gaussian distribution for the electrical field of a light beam has the form  $E(r) = E(0)\exp[-(r/w)^2]$ , where  $r$  is the distance from the center of the light beam and  $w$  is the radius at which the amplitude of the beam falls to 1/e of its maximum value of  $E(0)$ . Power is proportional to the square of the electric field, and so the intensity function is proportional to  $E(0)\exp[-2(r/w)^2]$ , which is also a Gaussian distribution."

Claims 2-11, also rejected as anticipated by Shukunami, depend from claim 1 and hence incorporate by reference the limitations thereof. Therefore, for at least the reasons noted above, Shukunami fails to anticipate claims 2-11. Reconsideration and withdrawal of the rejection of claims 2-11 is respectfully requested.

Claims 12-15 are rejected as obvious under 35 USC §103(a) over Shukunami in view of US Patent Application Publication No. 2006/0013545 A1 to Varnham et al. ("Varnham"). Claims 12-15 depend from Varnham and hence also incorporate limitations of claim 1. Varnham fails to remedy the above-noted defect of Shukunami. Reconsideration and withdrawal of the rejection of claims 12-15 as obvious over Shukunami in view of Varnham is respectfully requested.

Reply herein to other contentions presented in the outstanding Office Action in relation to the rejections or objections of pending claims is moot in light of Applicants' demonstration that the references fail to teach a limitation of all the claims, and accordingly any such matters need not be addressed herein. However, Applicants make no admission whatsoever by virtue of not addressing these contentions, and reserve the right to raise any challenges in the future.

#### **Amendment to the Specification**

Paragraphs 3, 28, 77, 79, 90, and 95 are amended to correct minor typographical errors. No new matter is added, as is evident by inspection of the nature of the proposed amendments. Entry of the amendments is respectfully requested.

#### **Restriction Requirement**

Applicants respectfully disagree with the Examiner's contentions regarding the Election/Restriction Requirement. However, Applicants understand that the Examiner has made the requirement final and that if any further review is desired it is up to Applicants to petition or appeal, as appropriate. No petition or appeal is filed at this time, and Applicants also acknowledge that restriction/election determinations can be difficult. Applicants place the following comments on the record, in part because the Examiner made comments that could be contended to have implications beyond restriction/election practice.

On page 2, paragraph 2, of the outstanding Office Action it is stated that the Applicants' traverse filed on 26 February 2007 is not deemed persuasive because "species are not required to

be mutually exclusive in order for an election requirement to be proper.” Applicants’ Attorney cannot reconcile this statement with MPEP § 806.04(f), which is entitled “Restriction Between Mutually Exclusive Species” and the first sentence of which reads “Where two or more species are claimed, a requirement for restriction to a single species may be proper if the species are mutually exclusive.”

On page 2, paragraph 3 of the outstanding Office Action states, in contending that claims 16-33 are not directed to Species I, that “[w]ithin the original specification the applicant has not disclosed or enabled any embodiment that includes both the photosensitivity and/or birefringence claimed within these claims and the outer core region having a higher concentration of a selected rare earth than does the inner region.” Applicants respectfully disagree with this statement and note that the Office Action has made none of the requisite findings for establishing a *prima facie* case of lack of written description or enablement in support of the statements. As one example, FIGURE 4 clearly shows a fiber having a core 218 having inner and outer regions, 224 and 220, respectively, and longitudinally extending regions 275 for providing birefringence. The core 218 having inner and outer regions can include at least any of the cores taught in the specification having inner and outer regions, including a core wherein the outer region has a higher concentration of a selected rare earth than the inner region.

Pages 2-3, paragraph 3 of the Office Action states that “Claims 34-43 are not directed to elected Species I, in fact these claims are mutually exclusive because these claims are directed to the inner core region having a higher concentration of a selected rare earth than does the outer core region.” Applicants respectfully disagree. For example, claim 39 recites “wherein the outer region comprises the first concentration of the selected rare earth” and claim 34, from which claim 39 depends, recites “any concentration of the selected rare earth comprised by the other region being less than the first concentration”, such that in the case of claim 39 the “other region” refers to the inner region, which accordingly has the lower concentration.

#### **Information Disclosure Statement**

Submitted herewith is a Fourth Information Disclosure Statement (IDS). It is respectfully requested that the Examiner initial the form PTO/SB/08a and return the initialed form with the next communication from the PTO.

**Electronic Payment of Fees**

Fees associated with this filing (Three Month Extension of Time fee of \$1050 and IDS fee of \$180) are being paid electronically. No other fees are considered to be due. However, if it is determined that an additional fee is due, or that an overpayment has been made, please debit or credit, as appropriate, Deposit Order Account 502343.

**CONCLUSION**

This Response is considered to address all matters raised by the Examiner in the outstanding Office Action bearing a Notification Date of 05/18/2007. Applicants respectfully submit that the claims patentably distinguish over the art relied upon. Reconsideration and withdrawal of all rejections and objections is respectfully requested.

Please do not hesitate to contact the undersigned if any issues are deemed to remain unresolved.

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